DISTRIBUTION AND ABUNDANCE OF THE MACKENZIE WOOD BISON HERD

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The interpretations presented in this report are those of the authors and do not necessarily reflect those of the Department.

ABSTRACT

An aerial survey was conducted for wood bison (Bison bison athabascae) in the Mackenzie Bison Sanctuary on July 15, 1983. We counted a total of 952 bison, 122 of which were calves of the year (12.8% of the total animals observed). The mean group size of non-calf bison was 15.1 ± 4.0 (S.E.) and the median group size was 4.0. Only two bison were found in the Mink Lake area to the west of the Sanctuary. More bison were found on small lakes than is usual, and also farther north within the Sanctuary than we expected. We hypothesized that this distribution pattern occurred because of unusually high water levels in the major dry lake basins of Falaise and Calais lakes to the south.

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INTRODUCTION

The March 1983 survey of the Mackenzie wood bison (Bison bison athabascae) herd found 980 animals, a figure which was lower than expected (Chowns and Graf 1987). However, for the first time close to 10% of the herd was found in an area well outside the Mackenzie Bison Sanctuary to the west near Mink Lake (Figure 1). Questions immediately arose concerning the status of these animals outside the normal distribution, i.e., are they now established as a subpopulation and spending all of their time in the area to the west? Will the cows that were in the Mink Lake area in March have their calves in this area away from the main population in the Sanctuary? Such questions were important to answer as the establishment of a separate herd could dampen the impact of a disease outbreak or a fatal fire on this endangered species population. Answering these distribution questions was the first objective of our July 1983 survey.

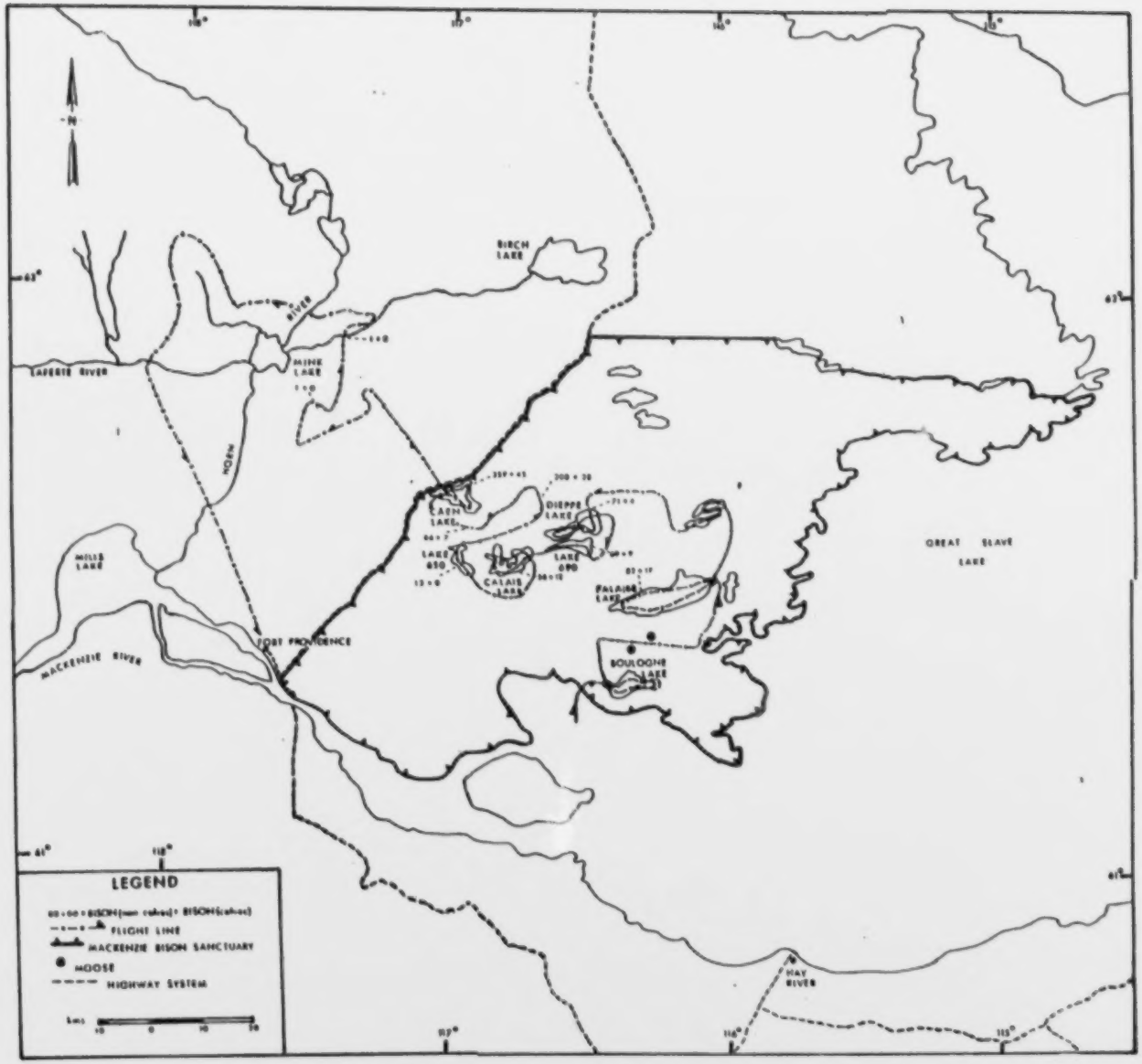

Figure 1. The survey route, locations and numbers of bison and other wildlife found inside and outside the Mackenzie Bison Sanctuary boundaries on July 15, 1983.

Our second objective for this summer survey was to obtain an estimate of the number and percentage of calves in the population. This data has been collected since the herd was first introduced to the area in 1963 and the rate appears to have decreased in the 1980s. This lower percentage of calves may explain the lower population growth rate found in recent years (Chowns and Graf 1987).

METHODS

The survey was conducted on July 15, 1983 using a Cessna 337 with two observers in the back and a navigator/recorder in the front right seat. We approached major lake basins at approximately 300m above ground level (agl) to locate all the groups on the lake and then approached each group at approximately 100m agl to count bison and classify the animals as calves or non-calves. We also photographed groups of more than 15 animals for later verification. This photography was conducted by flying directly above the group and then tilting the plane over on its right wing so that the right rear observer could take vertical photographs. We used high speed, colour film, which allowed us to identify calves which still had their reddish neonatal coats.

We surveyed only the main concentration areas the bison normally used in the Sanctuary at this time of the year (Chowns 1987), as well as the area around Mink Lake.

RESULTS

The weather on the day of the survey was not good for counting bison. There was 80-100% cloud cover and the winds were quite high, causing some discomfort for observers.

The major lake basins which usually hold the majority of the calf/cow groups in July and which are usually dry at this time of the year, were totally under water. We found some bison near these lake basins, i.e., Falaise and Calais lakes (Fig. 1), but many fewer than we would have expected from previous observations (Chowns 1987). We also found more and larger groups of bison with calves farther north than expected (Table 1). We found only two bison in the Mink Lake area west of the Sanctuary.

We counted 952 bison, of which 122 were calves (12.8%). The mean group size for non-calf bison was 15.1 $\pm$ 4.0(S.E.) (Table 1) and the median group size was 4.0. The bison reacted much less to the overflying aircraft than they had in March of the same year, in fact often the groups of cows and claves would not even stand up. During the winter it seemed to take much less disturbance to cause the groups to run (Chowns and Graf 1987).

Four moose (Alces alces) were observed during the survey.

Table 1. The number of bison found in and around the Mackenzie Bison Sanctuary on July 15, 1983. The overall mean group size was 15.1 ±4.0 (S.E.) non-calf bison and the median was 4.0.

AREA	NUMBER COUNTED			NON-CALF GROUP SIZES		
	Non-calves	Calves	Total	#Groups	Mean	Range
Falaise Lake	82	17	99	9	9.1	2-29
Dieppe Lake	71	4	75	8	8.9	1-31
Lake 690	69	9	78	7	9.9	1-24
Calais Lake	56	12	68	3	18.7	3-49
Lake 650	13	0	13	1	13.0	-
Caen Lake	259	45	304	13	19.9	2-68
Other (inside Sanctuary)	278	35	313	12	23.2	1-198
Other (outside Sanctuary)	2	0	2	2	1.0	-
TOTAL	830	122	952	55	15.1	1-198

(±4.0[S.E.])

DISCUSSION

It does not appear as though the Mink Lake animals found in March 1983 (Chowns and Graf 1987) have become established as full time residents in the area west of the Sanctuary. We found only two single bison in the Mink Lake area. The two junior authors had seen many tracks leading in both directions along some cut lines between the Mink Lake area and the Sanctuary during May and June 1983. However, as we counted only 830 non-calf bison, more than one hundred were missed. The count four months earlier had been 980 (Chowns and Graf 1987). It appears that the only sure way to determine whether or not some animals will remain permanently in the Mink Lake area is to radio collar some animals. This study has been initiated (C. Gates pers. comm.)

Fewer bison were found during the summer in open areas where they have been previously observed (Chowns 1987). This may have been caused by the large amounts of water in the main lakebeds such as Falaise and Calais. This reduced use of wet area as a result of changing water levels, must be considered when evaluating potential new areas for wood bison introductions. Some problems have arisen with excessively wet areas during recent re-introduction efforts (C. Gates pers. comm.).

Our second objective for this survey was met as we obtained an estimate of the percentage of calves in the population. The estimate of 12.8% is similar to calf percentages found since 1980 (T. Chowns unpubl. data), but is low compared to those found in the

1970s (Calef 1984). We probably classified 80-90% of the population. We do not know of any sampling bias in the method which would have caused a large error. The percentage of calves is probably a reasonable index of calf production and early survival, if it is obtained at the same time each year using the same methods. Although Calef (1984) suggested that it is difficult to account for all calves using aerial photography, we disagree if two procedures are followed. The first is to take vertical photographs using colour film. This reduces the problem of not detecting calves which are behind or close to their mothers's sides. The second procedure is to take more than one photograph of each group. We were able to distinguish calves on second photographs which had not been clear on the first ones. An evaluation of the aerial technique could be made by classifying bison on the ground, then photographing the same groups from the air. Caen Lake, located adjacent to the highway, would be a good location to conduct this experiment.

The mean group size for non-calf bison was similar to that found in March of the same year (Chowns and Graf 1987), but was lower than the mean found in July 1981 (Chowns 1987). Our median group size of only 4.0 suggests that perhaps the animals had started breaking into smaller groups for the rut (Calef and Van Camp 1987). However, one should be careful about interpreting group size data in view of the abnormal distribution of animals in the summer of 1983 and the unusually high water levels.

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PERSONAL COMMUNICATIONS

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